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Vol. 35-51

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PHILIPPINE BUREAU
OF EDUCATION

BULLETINS

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BULLETIN NO. 43—1912
BUREAU OF EDUCATION

PHILIPPINE SCHOOL OF ARTS AND TRADES

CATALOGUE 1911–12

WITH

ANNOUNCEMENTS FOR
VACATION ASSEMBLY

MANILA
BUREAU OF PRINTING
1912

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BUREAU OF EDUCATION PUBLICATIONS.

ANNUAL REPORTS:

First Annual Report of the Superintendent of Public Instruction, 1901. (Edition exhausted.)
Second Annual Report of the General Superintendent of Public Instruction, 1902. (Edition exhausted.)
Third Annual Report of the General Superintendent of Education, 1903. (Edition exhausted.)
Fourth Annual Report of the General Superintendent of Education, 1904. (Edition exhausted.)
Fifth Annual Report of the General Superintendent of Education, 1905. (Not issued in printed form.)
Sixth Annual Report of the Director of Education, 1906.
Seventh Annual Report of the Director of Education, 1907.
Eighth Annual Report of the Director of Education, 1908. (Supply limited.)
Ninth Annual Report of the Director of Education, 1909.
Tenth Annual Report of the Director of Education, 1910. (Supply limited.)
Eleventh Annual Report of the Director of Education, 1911.

BULLETINS:

1. The Philippine Normal School. Catalogue for 1903–4. English and Spanish. April, 1904 (Edition exhausted.)
2. A course of Study in Vocal Music for Vacation Normal Institutes. May, 1904. (Edition exhausted.)
3. The Philippine School of Arts and Trades, Prospectus for 1904–5. English and Spanish. June, 1904. (Edition exhausted.)
4. The Philippine Nautical School, Prospectus for 1904–5. English and Spanish. June, 1904. (Obsolete.)
5. Notes on the Treatment of Smallpox. June, 1904.
6. Reports of Industrial Exhibits of the Philippine Schools at the Louisiana Purchase Exposition. June, 1904.
7. Courses of Instruction for the Public Schools of the Philippine Islands. June, 1904. (Edition exhausted.)
8. Cursos de Enseñanza para las Escuelas Públicas de las Islas Filipinas. (Spanish edition of Bulletin No. 7.) June, 1904. (Edition exhausted.)
9. A list of Philippine Baptismal Names. June, 1904. (Edition exhausted.)
10. Government in the United States. (Prepared for use in the Philippine Public Schools.) June, 1904.
11. Courses in Mechanical Drawing. Woodworking, and Ironworking for Provincial Secondary Schools. June, 1904. (Obsolete.)
12. Advanced and Post-Graduate Studies Offered by the Philippine Normal School for Preparation for Entrance to American Colleges and Universities or to the University of the Philippines. English and Spanish. August, 1904. (Obsolete.)
13. Not issued in printed form.
14. The School Law of the Philippine Islands, as amended by Acts of the Philippine Commission to and including Act 1530, with Executive Orders and Attorney-General's Opinions affecting the Bureau of Education. January, 1906. (Edition exhausted.)

15–20. Not issued in printed form.

21. Philippine Normal School. Catalogue for 1904–5. English and Spanish. May, 1905. (Edition exhausted.)
22. Lessons on Familiar Philippine Animals. August, 1905. (Edition exhausted.)
23. Standard Course of Study in Vocal Music for the Public Schools of the Philippine Islands. 1906. Revised and reissued in 1910. (Editions exhausted.)
24. Outline of Year's Course in Botany and Key to the Families of Vascular Plants in the Philippine Islands. August, 1906. Revised and reissued in 1907. Third edition issued in 1908. Fourth edition issued in 1911.
25. Official Roster of the Bureau of Education, corrected to March 1, 1906. May, 1906. (Obsolete.)
26. High School and Secondary Courses of Instruction. June, 1906. (Obsolete.)
27. Philippine Normal School. Catalogue for 1906–7 and Prospectus for 1907–8. May, 1907. (Edition exhausted.)

27. (A). Philippine Normal School, Courses of Study, Secondary Course. January, 1908. (Obsolete.)

28. The Milkfish or Bañgos. May, 1908. (Supply limited.)
29. Constructive Lessons in English. Designed for use in Intermediate Grades. August, 1910. Revised and reissued, 1911.
30. Philippine Normal School, Catalogue for 1909–10 and Announcement for 1910–11. June, 1910. (Edition exhausted.)
31. School and Home Gardening. July, 1910.
32. Courses in Mechanical and Free-hand Drawing, for Use in Trade and Intermediate Schools. December, 1910.
33. Philippine Hats. December, 1910. (Supply limited.)
34. Lace Making and Embroidery. December, 1910.
35. Housekeeping and Household Arts—A Manual for work with the girls in the elementary schools of the Philippine Islands. February, 1911.
36. Catalogue and Announcement of the Philippine Normal School. May, 1911. (Edition exhausted.)
37. School Buildings, Part I. (In course of preparation.)
38. School Buildings, Part II. (In course of preparation.)
39. A Manual of Free-hand Drawing for Philippine Primary Schools. (In course of preparation.)
40. Athletic Handbook for the Philippine Public Schools. (In hands of printer.)
41. Service Manual of the Bureau of Education. (In hands of printer.)
42. Intermediate English-II-Notes, Directions, and Aids to the Preparation of the Correspondence Study Course.
43. Catalogue of the Philippine School of Arts and Trades, 1911–12.

(Continued on third page of cover.)

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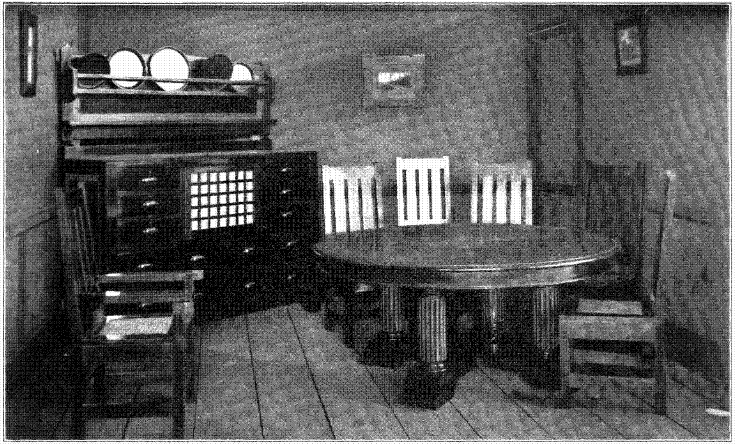


DINING ROOM SET IN RED NARRA, MADE AT THE PHILIPPINE SCHOOL OF ARTS AND TRADES, MANILA.

(This set was sold at the 1911 Carnival for ₱400.)

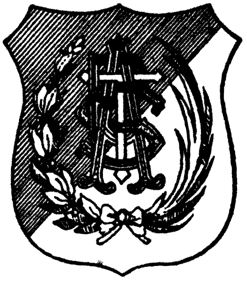
BULLETIN No. 43—1912
BUREAU OF EDUCATION

PHILIPPINE SCHOOL OF ARTS AND TRADES

CATALOGUE 1911-12

WITH

ANNOUNCEMENTS FOR
VACATION ASSEMBLY



MANILA
BUREAU OF PRINTING
1912

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CONTENTS.

Page.
Administrative officers, instructors, and employees 4
Historical sketch 5
General statement 6
  Location and buildings 7
  Admission of pupils 7
  Registration of pupils 7
  Fees and tuition 7
  Scholarship, discipline, attendance 8
  Opportunities for self-support 8
  Pensionados 8
  Medical assistance 9
  Athletics 9
  Inspection visits 9
  Library 9
  Certificates and diplomas 9
Plan of instruction 10
  Commercial work 10
  Trend of academic work 11
Courses 12
  Academic 12
  Drawing and design 15
  Machine-shop practice 17
  Woodworking 19
  Wheelwrighting 21
  Blacksmithing 22
  Ceramics 23
  Stationary engineering 24
  Automobile operation 26
  Drafting 26
  Normal course for industrial teachers 27
  Preparatory engineering 28
Teachers' vacation assembly 28
  Courses 29
Record of graduates 31
Enrollment by provinces and courses 32

ADMINISTRATIVE OFFICERS, INSTRUCTORS, AND EMPLOYEES.[1]

W. W. MARQUARDT, *Superintendent.*

Ambrosio Romans	Assistant in Drawing.
Charles Stewart	Instructor in Blacksmithing.
Amando Viola	Assistant in Woodworking.
Amado Ignacio	Assistant in Machine-shop Practice.
Marian R. Healey	Instructor in Academic Department.
Herman Gunther	Instructor in Wheelwrighting.
George Hofstetter	Instructor in Drawing.
Frank W. Cheney	Instructor in Woodworking.
Senicio Perlas	Assistant in Chipping and Filing.
H. Lawrence Noble	Instructor in Academic Department.
Ralph W. Taylor	Principal and Instructor in Academic Department.
Manuel Martinez	Assistant in Painting.
Bartolome Pascual	Instructor in Wood Finishing.
Anselmo Espiritu	Assistant in Drawing.
Hermogenes Pecson	Assistant in Woodworking.
Frank M. Johnson	Instructor in Academic Department and Director of Athletics.
Frank Rhodes	Instructor in Machine-shop Practice.
Clifford H. Crowe	Instructor in Ceramics.
Carl C. Long	Instructor in Stationary Engineering.
F. T. Rogers	Instructor in Academic Department.
Robert E. Hall	Instructor in Academic Department.
Alma Beck	Instructor in Woodworking.
Vicente A. Quintero	Assistant in Wood Turning.
Kanjiu Kato	Assistant in Ceramics.
Rufino Angeles	Assistant in Wheelwrighting.
F. W. Bashore	Instructor in Automobile Department.

Leonardo Matias	Cashier.
Pedro Cruz	Correspondence and Records.
Julian Roxas	Storehouse Clerk.
Perfecto Adepoint	Time-keeper.

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[1] Teaching corps listed in order of appointment.

THE PHILIPPINE SCHOOL OF ARTS AND TRADES.

HISTORICAL SKETCH.

In 1889, nine years before American occupation, the Escuela de Artes y Oficios (School of Arts and Trades) was established in Manila under the Spanish régime. This school had at one time a paper enrollment of 1,763 pupils with attendance unknown. Courses were given in printing, carpentry, carving, masonry, ceramics, blacksmithing, shoemaking, tinsmithing, wheelwrighting, and commercial branches. Originally the school was located in its own building, now remodeled and occupied by the Bureau of Printing, but the enthusiasm connected with its inception waned, and soon much of the enrollment and many of the courses were on paper only, and before the days of American occupation the school was closed.

In 1901, when the civil government under Governor William H. Taft succeeded the military government under General MacArthur, the first American teachers in the Bureau of Education were already in Manila. The organic Act providing for civil government made provisions for the Philippine School of Arts and Trades and the School of Commerce while the College of Fine Arts was established in 1908. By these changes the work formerly carried on nominally by the Escuela de Artes y Oficios in an inadequate manner is now cared for by the Bureau of Printing, the Philippine School of Arts and Trades, the Philippine School of Commerce, and the College of Fine Arts, the last three institutions averaging five hundred students each.

From 1901 to 1906 the Philippine School of Arts and Trades was housed in temporary exposition buildings. Since that time it has occupied four of the city shops, to which it has been necessary to add four frame buildings erected by the pupils themselves. Further development in the present plant is impossible and funds have been appropriated and plans are almost completed for new buildings on a large site which has been secured. The new plant will provide accommodations for six hundred day school pupils and three hundred night school pupils. All of the buildings will be constructed of reinforced concrete. An auditorium, open-air gymnasium, lockers and baths, rest rooms, janitors' quarters, school restaurant, library, sales exhibit room, dry kilns, and lumber sheds will be features of the new group of buildings.

The number of courses has gradually increased from two in iron and woodwork to nine which include carpentry, machine-shop practice, blacksmithing, wheelwrighting, stationary engineering, ceramics, drafting, preparatory engineering, and normal industrial work. The attendance has increased from a mere handful of pupils to over five hundred. The entrance requirement has been raised from practically nothing but an age limit to the equivalent of the sixth grade in the United States. The academic work has gradually expanded from the merest rudiments of English and arithmetic to the completion of a stiff highschool course. The standard of the work in all departments has been steadily raised until the Civil Service Bureau has recognized the thoroughness of the work by making the graduates of the normal industrial course eligible to appointment as Government teachers without further examinations.

GENERAL STATEMENT.

The school is designed primarily to train young men who plan to follow a trade for a livelihood. The purpose of the preparatory engineering course and the normal course for industrial teachers is explained in the names of the courses themselves. No one is admitted without previously signing a written statement to the effect that it is his intention upon graduation to follow the trade pursued in school. It is thus presumed that every pupil has a definite purpose in attending the school and that he means business. As soon as it is discovered that a pupil has no mechanical bent or that he is not making the most of the opportunities, he is immediately advised to leave the school.

LOCATION AND BUILDINGS.

The school is located on Calle Arroceros facing the Botanical Gardens. It occupies four of the city shops and four frame buildings erected by the pupils themselves. Plans have been completed for a set of concrete buildings to be located on Calle San Marcelino at a cost of ₱500,000 of which amount ₱225,000 have been appropriated.

ADMISSION OF PUPILS.

Qualifications.—For admission to the trade courses the applicant must have completed the primary course in the public schools or its equivalent in some other recognized institution of learning. The academic work is so arranged, however, that pupils of higher attainments may proceed with their academic instruction without repeating any of their work. The possession of an intermediate certificate or its equivalent is required for admission to advanced courses.

Only strong, well-developed boys, over 14 years of age, need apply for admission. The shop work is difficult and can not be performed satisfactorily by boys below the average in strength.

REGISTRATION OF PUPILS.

Matriculation takes place during the first two weeks of the school. After this period pupils are admitted occasionally by transfer in case vacancies exist. Each year, over three hundred applicants are refused admission owing to lack of facilities. Pupils coming from a distance should be on hand on the opening day or, better yet, should arrange for their admission by mailing an application card in advance.

FEES AND TUITION.

No fees or tuition charges are made. A deposit of 50 centavos is required from each pupil to cover loss and breakage of tools. After the required deductions are made, the proportional part due each pupil will be returned provided he has not left school and is present on the last day thereof.

SCHOLARSHIP, DISCIPLINE, ATTENDANCE.

No one is allowed to remain more than two years in the same grade. In case of a second failure to make the required standing for any one grade, the pupil must leave school unless his shop instructor recommends him for proficiency in shop work in which case he must devote all of his time to drawing and shop work. Low grades in shop work are considered sufficient grounds for dropping a pupil, no matter what his academic grades may be.

Strict discipline is insisted upon at all times. No set of formal rules has been formulated as each pupil is expected to act like a gentleman at all times. A first break of good conduct meets with suspension while a second brings on expulsion.

Two unexcused absences in a month are deemed sufficient grounds for separation from the school.

OPPORTUNITIES FOR SELF-SUPPORT.

Fifty pupils earn their board and lodging by working as house boys out of school hours. Seventy-five more earn all or part of their expenses, as clerks, stable boys, painters, photographers, gardeners, cigar makers, teachers, etc. No pupil from the provinces is advised to come to Manila depending upon securing employment for his maintenance unless he can obtain sufficient funds to support himself for the first year. Suitable board and lodging can be obtained at ₱15 per month exclusive of laundry.

PENSIONADOS.

Forty-five boys are enrolled as teacher pensionados, nine as student pensionados, and seven as municipal pensionados. Teachers having two years' experience are eligible to appointment as teacher pensionados while student pensionados are appointed from secondary classes. These appointments are made upon recommendation of the division superintendent and with the approval of the Director of Education. Municipal appointments are made by the municipal councils from a list of eligibles submitted by the division superintendent. Each pensionado signs a written contract to work for the Insular Government or the municipality which meets his expenses for as long a period as he receives a pension.

MEDICAL ASSISTANCE.

Free medical assistance is given to all pupils by the Philippine General Hospital upon presentation of a request signed by the superintendent of the school.

ATHLETICS.

The work in the shops tends to strengthen the physical development of all the pupils. Class baseball teams play match games with each other while the first and second teams meet outsiders. The first team has always taken a high place in the league games and last year won the Carnival championship. Volley ball is rapidly coming into favor. Shop teams play a regular schedule and the first team plays against outside opponents. Training for field and track events is provided for all candidates for the team which meets in annual contests with other schools.

INSPECTION VISITS.

Visits of inspection to the largest commercial and manufacturing plants in the city are made by shop classes. Great interest is taken in these trips and considerable value is derived therefrom. Among the places visited last year were the Ice Plant, the Bureau of Printing, the machine shops on Engineers' Island, the Germinal Tobacco Factory, Gsell's Match Factory, the Bureau of Science, and other points of interest.

LIBRARY.

A small technical library of carefully selected books is open for the use of teachers and pupils. Biography and fiction will be added as soon as better library facilities are offered in the new plant.

CERTIFICATES AND DIPLOMAS.

Graduates from the normal course for industrial teachers are eligible to civil service status as junior industrial teachers without further examination.

Diplomas are granted to those pupils who satisfactorily complete a four years' trade course and the academic work and drawing prescribed for the first year secondary. After 1912, diplomas will be issued only to such of the above who shall have had one year's successful experience in trade work in addition to the work taken at the school or who shall have completed the academic work of the secondary course.

Certificates are issued to those who complete the prescribed shop work but who fail to reach the required academic standing.

PLAN OF INSTRUCTION.

COMMERCIAL WORK.

One of the most valuable features emphasized in the school is the commercial work, which is done not only for various branches of the Government but also for private individuals. Last year the returns from this work amounted to over $17,000. This not only paid for all materials and supplies consumed in the school but also allowed the employment of a great deal of student labor performed out of regular hours and during vacation periods, thus enabling many of the pupils partially to pay their expenses while attending school.

The beginning work in all shops is confined to carefully graded exercises made from blue-prints. Even in this work, exercises of practical value are given preference over exercises of theoretical value and of doubtful applicability to real work.

After the first year, the pupils are advanced in commercial work as rapidly as possible. Orders for a large number of single articles are not taken and as a result the great bulk of the commercial work requires special designing, thus necessitating a great deal of preliminary work in the drafting department and preventing the possibility of a pupil's having work which can be performed in a purely mechanical manner without continued mental alertness.

Many schools decry all commercial work although not one but points with pride to every piece of practical work done by its pupils. Although a mooted question in the United States, the value of commercial work in the schools is not questioned in the Islands. An American trade school boy learns most of his trade after leaving school while a Filipino boy, unless he comes from two or three of the largest cities, must depend upon what he has learned in schools, owing to the low state of mechanical development and the paucity of skilled mechanics in the provinces.

The American boy learns modern shop organization and business practice when he gets into the world but the Filipino boy with but few exceptions has no such opportunity and it is mainly for this reason that an accurate cost accounting system has been introduced into the school. For all commercial jobs, work orders are made out, labor is reported on daily time slips, materials are issued only by the storekeeper on properly executed requisitions, and tools are checked in and out by pupil toolkeepers. Although emphasis is laid strongly upon commercial work and many phases of modern shop organization are maintained, yet the use of carefully worked out exercises in the first year, the judicious intermingling of class and individual exercises, and the correlation of the drawing and academic branches with the shop work, make a real educational institution and not a factory with its usual attendant evils.

TREND OF ACADEMIC WORK.

In arithmetic, stress is laid upon practical problems which are submitted by the shop instructors, graded by the academic teachers, and taught either in lieu of or supplementary to the regular texts. The problems cover various phases of all trades taught in the school, deal almost exclusively with articles and affairs pertaining to local conditions, and make use of current market prices and measures. In language work, phrases, sentences, paragraphs, and themes dealing with shop tools, materials, and experience are encouraged. In addition to the common words found in the regular reading texts, a spelling list of all shop tools, materials, and equipment used in each trade has been compiled and made an essential part of the curriculum. In reading, emphasis is placed upon literature dealing with industrial subjects, with the purpose not only of widening the pupil's practical knowledge of the trades but also of inculcating the dignity of labor. Current newspapers and magazines are read in class so as to stimulate the reading habit and to enable the pupils to grasp the meaning of articles written in what is to them a foreign language. In civil government, the classes review their work by organizing school councils, provincial boards, and Insular assemblies.

COURSES.

The trade courses are as follows: Machine-shop practice, woodworking, wheelwrighting, blacksmithing, ceramics, stationary engineering, and automobile operation. The entrance requirement is the completion of the primary course of study. The advanced courses are: Normal course for industrial teachers, preparatory engineering, and drafting. The completion of the intermediate course is required for admission to advanced courses. Academic work and drawing is prescribed for all regular pupils with the exception of those taking automobile operation.

The school day is divided into eight periods, four of which are devoted to shop work and lectures, three to academic classes, and one to drawing.

ACADEMIC COURSES.

The academic work offered embraces the essential subjects of the intermediate and secondary courses. The trade courses require the completion of the academic work of the first year secondary while the advanced courses require the completion of the fourth year secondary. This makes an elastic system by which a pupil is able to enter the academic grade to which he belongs provided he makes up the shop work and drawing required for that grade. The prescribed work is as follows.

GRADE V.

Grammar and composition.—One period daily. Elementary Grammar and Composition, Gibbs, completed. Also Constructive Lessons in English, Fee, lessons 1 to 17.

Reading and spelling.—One period daily. (*a*) Fourth Reader, Stepping Stones, and Fifty Famous Stories. (*b*) Spelling to be given in connection with the reading lessons and special lists of shop terms. (*c*) Manners and Right Conduct. Circular No. 143, series 1910.

Arithmetic.—One period daily. Complete Arithmetic, Part I, Mercer-Bonsall, completed and supplemented by specially prepared shop problems.

GRADE VI.

Grammar and composition—One period daily. Advanced Grammar and Composition, Gibbs, Part II. Also Constructive Lessons in English, Fee, lessons 18 to 40.

Reading and spelling.—One period daily. (*a*) Fifth Reader, Stepping Stones; Stories of Industry, Chase & Clow; and Columbus and Magellan, Lawler. (*b*) Spelling to be given in connection with the reading lessons and special lists of shop terms. (*c*) Manners and Right Conduct. Circular No. 143, series 1910.

Arithmetic.—One period daily. Complete Arithmetic, Part II, Mercer-Bonsall, completed and supplemented by specially prepared shop problems.

GRADE VII.

Grammar and composition.—One period daily. Advanced Grammar and Composition, Gibbs, Part III, completed.

Reading and spelling.—One period daily. (*a*) Philippine Citizen, Jernegan, five months. (*b*) History of the Philippines, Jernegan, three months. (*c*) Current newspapers and periodicals, two months. (*d*) Manners and Right Conduct. Circular No. 143, series 1910.

Arithmetic.—One period daily. Complete Arithmetic, Mercer-Bonsall, Part III, completed and supplemented by specially prepared shop problems.

FIRST YEAR SECONDARY.

Literature.—One period daily. Great American Industries, Rochleau; The Alhambra, Irving; and Captains of Industry.

Theme writing.—One period daily. Maxwell and Smith's Writing in English.

Algebra.—One period daily. Milne's High School Algebra to page 190.

SECOND YEAR SECONDARY.

Literature.—Three periods a week. The Lady of the Lake. Current periodicals.

Theme writing.—Two periods a week. Maxwell and Smith's Writing in English.

Mathematics.—One period daily. First semester: Algebra, Milne's High School, completed. Second semester: Plane Geometry, Wentworth, first two books.

Physics.—One period daily. Millikan and Gale's First Course in Physics.

THIRD YEAR SECONDARY.

Literature.—Three periods a week. Silas Marner, scientific magazines and reviews.

Composition and rhetoric.—Two periods a week. Lockwood and Emerson's Composition and Rhetoric, Parts I and II.

Mathematics—One period daily. First semester: Wentworth's Plane Geometry, completed. Second semester: Wentworth's Solid Geometry, completed.

Elementary mechanics.—One period daily. For the year 1912–13, Merriman's Strength of Materials will be used.

FOURTH YEAR SECONDARY.

Literature.—Three periods a week. Emerson's Essay on Self-Reliance and other selections. Scientific magazines and reviews.

Composition and rhetoric.—Two periods a week. Lockwood and Emerson's Composition and Rhetoric, Parts III and IV.

Mathematics.—One period daily. First semester: Plane Trigonometry, Wentworth. Second semester: Intermediate Algebra, Wentworth.

Chemistry.—Two periods daily. Elements of Chemistry, William.

DRAWING AND DESIGN.

Aim.—The aim in arranging the subjects in this department has been threefold: First, to offer such work as will correlate with the regular trade courses and will be of practical value to a mechanic; second, to offer a normal course so designed as to prepare a teacher efficiently to conduct classes in the primary and intermediate grades of the public schools; and third, to offer a course planned to meet the large and growing demand for men trained in the technical details of the various branches of drafting.

Equipment.—Two large rooms, well lighted, containing a floor space of 250 square meters, are used for instruction in drawing and design. A separate room containing the necessary apparatus is used for blue-printing. Tracings of over five hundred valuable drawings are filed and referred to by a card catalogue. A card index is kept showing the record of all pupils who enter this department. The department is equipped with eighty individual drawing tables, models of various kinds, filing cases for tracings, drawings, and blue prints, and storage cases for instruments and supplies. Each pupil has a drawing board, T square, and a complete set of instruments; in addition, curves, protractors, easels, a pantograph, etc., are used as occasion demands.

Drawing for trade courses.—The work in this course is differentiated for each of the trades studied by the pupils in the various shops and is so arranged as to correlate with the practical work in the shops.

Beginning with sketching as a foundation for industrial drawing, a thorough training is given in free-hand as applied to mechanical drawing, which develops a knowledge of projection, a training in observing minute details as illustrated in the proper proportions of a drawing, and efficiency in the reading of elementary shop drawings. Emphasis is laid upon the making of free-hand Gothic letters.

Instruction on the care and use of instruments is correlated with geometrical drawing and such problems are constructed as have a direct bearing upon shop work and which also aid in the most efficient manner in developing the fundamental principles of mechanical drawing.

Drawing schedule for trade courses.

	Woodworking.	Machine-shop practice, blacksmithing, and stationary engineering.	Wheelwrighting.	Ceramics.
First year (a)	Sketching, lettering, geometrical drawing, instruction on the care and use of instruments, mechanical drawing of shop exercises, and blue-printing.			Free-hand drawing and decorative design. Rendering in colors. Elementary mechanical drawing, care and use of instruments.
Second year (b)	Detailed and assembled drawings.		Detailed and assembled drawing throughout the year.	Elementary design for potters, with water color rendering and advanced mechanical drawing.
	Elementary furniture design.	Design of tools.		
Third year (c)	Advanced furniture design.	Sheet metal and pattern drafting. Elementary machine design.	Elementary design.	Advanced design and mechanical drawing for potters. Rendering in colors, continued.
Fourth year (d)	Building design and construction.	Machine design.	Vehicle design.	Continuation of second and third years' work. Kiln design and construction.
	Estimating, specifications, and contracts.			

NOTE.—(a) (b) First and second years in drawing irrespective of academic standing. (c) (d) Third and fourth years, secondary. (c) All pupils will have elementary mechanics and estimating correlated with their work in drawing.

Drawing for normal industrial course.—

FIRST YEAR.

I. Free-hand drawing, including water coloring and charcoal work. This consists both in object drawing and in the making of original drawings and is applied in detail to life and action figures, perspective, and conventionalized and decorative forms.

II. Free-hand sketching and designing. This consists in preliminary practice in lining and proportioning, and in elementary designing of furniture, shop equipment, and bamboo work.

III. Mechanical drawing, tracing, blue-printing, estimating, and review. This includes lectures on the care and use of instruments, practice in ruling and lettering, geometrical drawing,[1] orthographic and isometric drawing, tracing and

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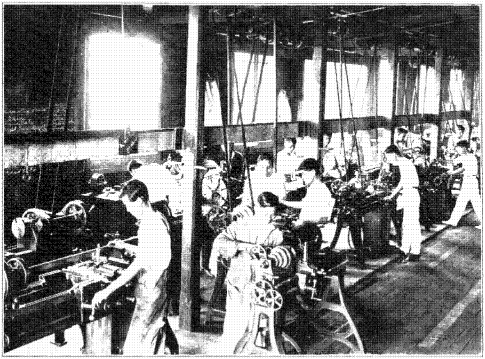
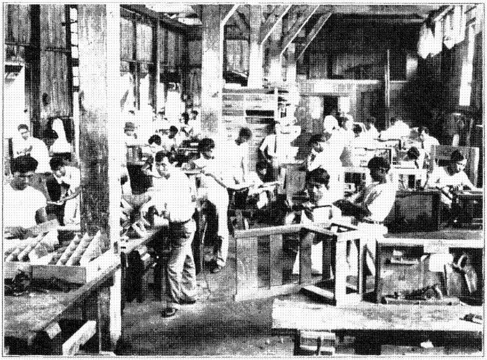
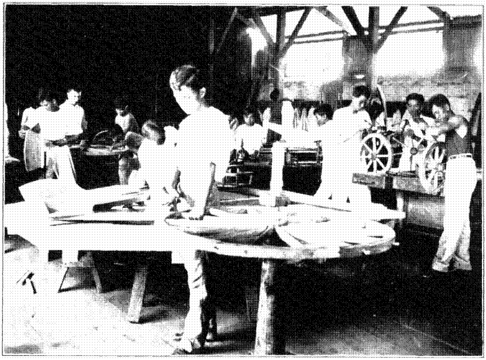
[1] See description of work in drawing for trade courses.



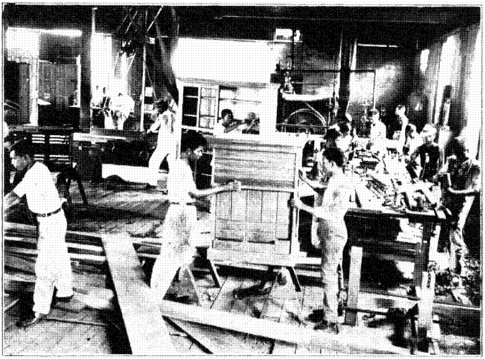
AT WORK ON THE LATHES.



BENCH WORK ON WOOD.

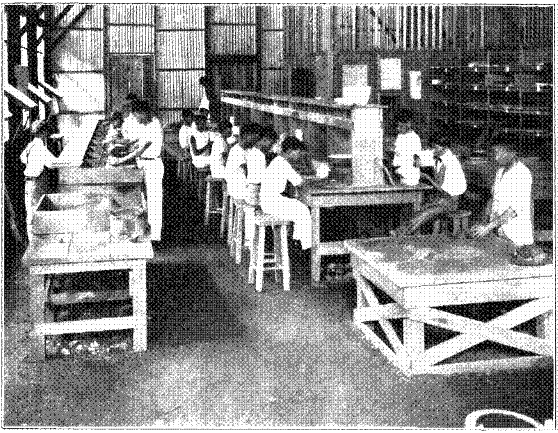


A SECTION OF WHEELWRIGHTING DEPARTMENT.

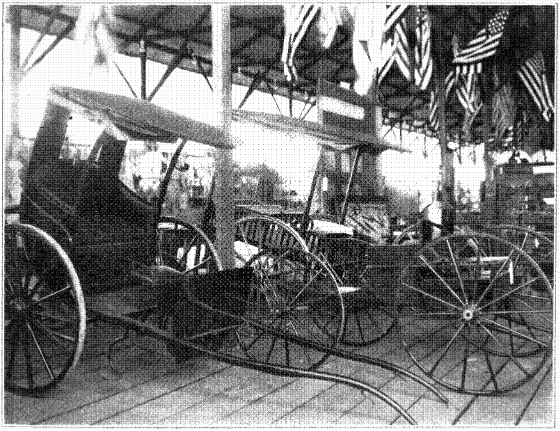


ONE HALF OF WOOD MACHINE SHOP.

PLATE III.



A CLASS IN CERAMICS.



WHEELWRIGHTING DISPLAY AT 1911 CARNIVAL.

blue-printing. The pupils prepare estimates from the blueprints. Toward the close of the year a general review is given covering the work completed and is discussed in detail with reference to its relation to the prescribed drawing for the different grades of public schools.

SECOND YEAR.

Throughout the second year the course follows the same general plan as in the first year; the pupil taking up each subject in detail and continuing with advance work gives especial attention to the development of original designs.

THIRD YEAR.[1]

The work of the third year begins with projections, theoretical and practical, followed by advanced furniture designing and simple building construction and designing. Instruction is also given in map drawing.

FOURTH YEAR.

This is mainly a continuation of the previous year's work, each subject being treated more fully in detail. The course includes the preparation of complete estimates, specifications, and contracts. During this year the pupils are required to take charge of the drawing classes and thus obtain practice in teaching under the supervision of instructors.

MACHINE-SHOP PRACTICE.

Equipment.—The shop is equipped with one 14-inch and one 20-inch American lathe, one 16-inch Manning, Maxwell and Moore lathe, four 12-inch Niles-Bement lathes, one American shaper, one milling machine, Le Blonde, one American crank shaper, one Pratt and Whitney crank shaper, one Sigourney sensitive drill, one Niles-Bement-Pond 24-inch power drill press, one Barnes 25-inch power drill press, one Greenard arbor press, and one Diamond power emery wheel.

FIRST YEAR.

All pupils taking the course must spend the first year at bench work or in the blacksmith shop. In the latter case, special attention is given later to bench work. The bench work consists of a series of carefully graded exercises in chipping and filing in which the following are some of the articles made from blue-prints exclusively—nuts, bolts, hammers, clamps, hinges, surface gauges, thumbscrews, etc.

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[1] Elementary mechanics will be correlated with the work in drawing.

Accuracy, neatness, and patience, the cardinal virtues of a successful machinist, are cultivated and pupils showing themselves unable to acquire these habits are at once dropped from the course. The names and classification of files, the correct way to swing a hammer, the best way to guide a chisel, and the uses of a machinist's square and straight edge are learned. Polishing is done by use of emery and oil paper. Scrapers, hacksaws, taps and dies, and drills are needed in the work and their uses are learned both by practice and precept.

SECOND YEAR.

In the second year, the pupil is set to work on a drill press and crank shaper and later in the year on the lathe. The prescribed drill press work includes the grinding of drills, oiling, and the proper drilling of holes to dimension by the use of both flat and twist drills. On the crank shaper, the pupil is taught how to set up work with the surface gauge, the planing of parallel strips and angle plates, and the cutting of key ways.

THIRD YEAR.

The third year is spent on the lathe, planer, and milling machine. The lathe work involves work held in chuck, such as boring out pulleys, working between centers, turning straight or taper work, cutting right and left handed threads, use of back and follow rests, and the placing of gears to cut required thread. Machine beds and bevel surfaces are planed. Spiral, worm, bevel, and straight gears are cut on the milling machine and flat surfaces are milled. Reamers and taps are cut and cutters are ground. Proper methods of babbitting are included in this year's work.

FOURTH YEAR.

The last year is devoted to the building of one or two machines. At present the castings are not made in the school but provision has been made for a foundry in the new plant so that every operation connected with the making of a machine may be carried out wholly by the pupils. For 1911–12, two air compressors, two bench grinders, and one circular saw frame are being made. The greater part of the year is spent on commercial work. The garage requires many spare automobile parts and a great deal of outside work is done. The following order is a sample of the variety of practical work done: One 1-cylinder crankshaft, two 2-cylinder crankshafts, one 4-cylinder crankshaft, twelve connecting rods, twenty valves and stems, six cam shafts, eighty-eight steel studs, twenty washers, ten wrist pins, and two bronze gears.

WOODWORKING.

Equipment.—The woodworking department occupies two large shops. The department for first year pupils is equipped with a full assortment of hand tools and double work benches. After the first or second year, depending upon individual proficiency, the pupil advances to the wood-machine department which is furnished with one Fay and Egan 26-inch planer, one Oliver hand jointer, one Fay and Egan circular saw frame, seven Putman 10-inch lathes, two Putman 18-inch lathes, one Fay and Egan 7-inch lathe, one Fay and Egan molding machine, one Oliver wood trimmer, one Fay and Egan band-saw, one automatic knife grinder, one power emery wheel, one automatic band-saw sharpener, and one 25-horsepower steam engine and boiler.

First Year.

Instruction is given by short talks and long practice in the use, classification, and care of tools. A definite course is given in grinding and sharpening tools. All exercises are made from blue-prints and among others include the following: Planing to a definite gauge mark; squaring and chamfering; gluing, clamping, and sandpapering; rip, cross, and back sawing; rabbetting; and making joints such as lap, half lap, mortise and tenon, dowel, etc. Special attention is given to learning the most important of the great varieties of native woods and their commercial uses. Toward the close of the year, repair work is undertaken and simple pieces of furniture are constructed.

SECOND YEAR.

One-half of this year is devoted to wood-turning which covers the study of the names of the parts of the lathe, the use and care of the tools, turning single curves, face plate turning, hollow turning, and sandpapering and polishing. After completing the prescribed set of exercises, most of which are of practical value, the pupil turns out commercial work such as trays, dumb-bells, Indian clubs, table legs, powder boxes, taborets, and the like. The balance of the year is spent in plain cabinet working where proficiency is obtained in using harder woods and in applying to practical uses the joints previously learned in exercise work.

THIRD YEAR.

Emphasis is placed in the third year upon finishing and polishing. Each pupil is given experience in finishing in oil, wax, and varnish, both brush and rubbed, and in applying French polish or piano finish. Pupils become thoroughly familiar with the use of the woodworking machinery and the dry kiln and do considerable advanced cabinet work.

FOURTH YEAR.

Estimating, hardware, shop methods, commercial work, practice teaching for those intending to become industrial teachers, and building construction for others, occupy the fourth year's work. The following order is a sample of the practical work done from working drawings: one kindergarten table, two chairs for children, eight school desks, two dining tables, twelve washstands, two hat racks, five beds, and two boards for weaving.

Six manual training centers in the city schools are supplied with pupil teachers who teach under the supervision of the head of the woodworking department. The instruction in building work is confined mainly to the drafting department but each year one or two full size frame buildings are erected by the class, thus affording practical demonstrations of the varied problems connected with actual building.

WHEELWRIGHTING.

Equipment.—The wheelwrighting department occupies two large rooms, one for the shop and one for finishing. The shop is plentifully equipped with a full line of work benches and hand tools in addition to a hub boring and a tenon machine. All of the machines in the wood machine department are also available for use.

FIRST YEAR.

The work is practically that outlined for the woodworking course. It includes the use and care of tools and the making of a carefully graded set of exercises from blue-prints. These exercises consist of planing to a definite gauge mark; squaring and chamfering; gluing, clamping, and sandpapering; rip, cross, and back sawing; rabbetting; paneling; making such joints as are used in vehicle construction; and a study of the varieties and uses of native woods.

SECOND YEAR.

In the second year wood-turning is first taken up. The names of the parts of the lathe, the use and care of tools, turning single curves, and sandpapering are studied. After completing the prescribed set of exercises, special attention is given to the turning of hubs of various kinds. Later in the year, the making of spokes, the boring, mortising, and filling of hubs, making of felloes, completing wheels, and elementary work in making simple parts of vehicle bodies and running gears are prescribed.

THIRD YEAR.

Advanced work is given in laying out patterns of frame work for vehicle bodies, and in cutting out and assembling materials for bodies and running gears. Work is then taken up in the paint shop where instruction is given in trimming, painting, and varnishing. Estimates on cost of labor and materials are then worked out in accordance with business practice.

FOURTH YEAR.

The last year is devoted to shop organization and methods and to the making of complete wheelbarrows, push carts, carretons, carretelas, calesas, buggies, and wagons.

BLACKSMITHING.

Equipment.—The shop is 110 feet by 36 feet wide. It is equipped with ten concrete forges made by the pupils themselves. The blast is furnished to the fires by a blower operated by steam power. Each forge is equipped with one anvil, one tool stand, hammers, tongs, pincers, flatters, fullers, punches, and round and cold chisels. The shop is also equipped with a hand drill, a Niles-Bement-Pond 1,500-pound steam hammer, and a swinging crane to handle the heavy forgings. The power drill in the machine shop is used whenever occasion demands. No pupil is allowed to use the steam hammer until he has learned to swing a sledge, thus the use of machinery does not preclude the important hand skill which every blacksmith must possess.

FIRST YEAR.

For the first two months the new pupil acts as assistant to one who has been in the shop for some time. During this period he becomes hardened to the work and learns how to build a fire and to swing a sledge. In company with another student of equal experience he is then given a forge. His greatest difficulty lies in heating material, usually failing to heat sufficiently for good work through fear of burning the iron. In order to give confidence and experience in the art of heating, he is given old horseshoes to heat and weld into rough stock and then to draw into shapes and sizes suitable for exercise work. Useful articles such as links, rings, eyebolts, hooks, and chains are then made from blue prints drawn to scale. The next series of exercises includes tools such as tongs, calipers, cold chisels, compasses, and punches.

SECOND YEAR.

At the beginning of this year, the pupil is required to repair all of his tools and make new ones to replace those worn out. The making of the various welds and their application and the use of split work, or making of forgings without welds, are learned. Annealing, hardening, tempering, and case hardening are taken up and instruction is given in the different grades of iron and steel. Minor repairs are also taken up this year.

THIRD YEAR.

Wagons, buggies, handcarts, and other vehicles are ironed off. The pupil is required to design the ironing, estimate cost of labor and materials, and complete the work. All of the vehicles made in the wheelwrighting department are ironed off in the blacksmith shop. Machine blacksmithing is also done and crankshafts, connecting rods, rocker arms, and other parts of machinery requiring forging are made.

FOURTH YEAR.

The work in the fourth year is wholly practical in nature and is designed to give more experience to such pupils as are not considered proficient at the close of the third year.

CERAMICS.

Aim.—The course of ceramics aims to do two things, to turn out graduates with a general knowledge of clay work and to investigate and determine the usefulness of Philippine clays. Instruction is given in such a way that a graduate may be able to decide on a location and there begin clay work with the minimum expenditure of capital. The pupil is taught with the idea in mind that he must go into the provinces and make use of resources at hand.

Equipment.—This department is equipped with twelve potters' wheels, sets of molds, clay-refining apparatus, iron glaze mill, ball grinder, lathe, polisher, cup machine, plate and saucer machine, large kiln, and a small test kiln. The potters' wheels, blunger, and settling tank were made by the pupils of the woodworking department. The molds, kilns, and all kiln furniture were made by the pupils in ceramics.

FIRST YEAR.

Small articles are made on the wheel. Modeling is done so as to impart ideas of form. Pupils are required to make molds and produce salable articles from them. All pupils assist in preparing and applying glazes and in charging biscuit and glazed wares. Applied elementary science consisting of lectures on geology and chemistry as applied to ceramics and experiments on clays and glazes are given. The application of practical designs to pottery is taken up.

SECOND YEAR.

The work is an expansion of that begun in the first year. The aim is to produce more commercial work. Larger articles are attempted and machine work is begun. More attention is given to the blending of clays and glazes. In addition to the terra cotta of the first year, stress is laid upon stone ware, faïence, and porcelain. Applied elementary science is continued and includes composition of bodies and glazes. Applied design in connection with under glaze coloring is taught. All pupils must take notes on firing.

THIRD YEAR.

This year places stress on speed and accuracy. Drill is given on fitting covers and joining handles, spouts, etc. The manner of charging porcelain is taught. Applied elementary science of this year includes composition of glazes and colors and lectures on kiln construction. The work in applied design includes over glaze coloring. The pupils are required to do the actual work of firing. At the end of this year a student should be able to build, equip, and manage a pottery school or a small factory.

FOURTH YEAR.

This year is to give the pupils a chance to specialize so they can fit themselves to take up any branch of ceramic work. Special stress is given to factory management and commercial output.

STATIONARY ENGINEERING.

The four year trade course in stationary engineering is designed to prepare for positions as stationary engineers, marine engineers, or automobile repairmen. During the entire course half of the time is spent in academic work in the class room and half in shop work.

The first two years are spent in acquiring the rudiments of the ironworking trade in the various shops of the school. The work for the first half of the first year consists of chipping and filing exercises while the last half of the year is spent in the blacksmith shop on forging and welding practice. The entire second year is spent in the machine shop where the pupil becomes familiar by actual contact with work on the turning lathes, and boring and milling machines. Exercise work fills the first part of the year until the pupil has acquired sufficient proficiency to take up some commercial machine work.

These first two years are designed to determine the capacity and mechanical ability of the pupil and none but those who by the quality of their work promise to be successful are allowed to continue in the third and fourth years of the course.

The last two years are taken in the automobile and stationary engine repair shop. The school owns two automobiles which are always available for driving practice or demonstration. In addition a large amount of repair work is done under the supervision of the shop instructors. Steam, gasoline, and kerosene engines are brought to the school for testing and adjusting so that the pupil becomes familiar with the operation and repairing of almost every type of engine in common use. In addition to the shop work of the last years of the course, a course of lectures is given in order to instil an elementary knowledge of the theoretical side of the trade. During the third year the lectures include a study of mechanism in common use such as gears, belts, link motions, levers, etc. In the latter part of the year the different types of engines are studied in an elementary way so as to get the distinguishing features and the names of parts. The lectures during the first half of the fourth year deal with elementary theory of gas and steam engines, and boilers, taking up the two cycle and the four cycle principles, the slide valve, and the types of boilers. The last half of the year is spent in the study of adjustments and setting valves, care of engines and boilers, and the proper methods of operating and repairing.

In the shop the pupil is allowed as far as possible to follow the particular line of work for which he is preparing himself.

AUTOMOBILE OPERATION.

A short course of from five to nine months is given as preparation for positions as drivers for automobiles. The length of time necessary to complete this course depends upon the ability of the pupil, no one being given a certificate who is not capable of properly taking care of an automobile of any type. The entire time is spent in the shop and in driving practice, no academic work being given. Elementary lectures are given in order to teach the names of parts and methods of caring for a car. Practice is given in driving, adjusting carburetors, cleaning, oiling, and discovering causes of trouble on the two cars owned by the school. No difficulty has been found in giving every one who qualifies a good position. The demand has always been greater than the supply.

DRAFTING.

To enter the drafting course the pupil must have completed the intermediate grades of the public schools, in addition to at least two years of shop work, as the grades in this course correspond to those in the regular secondary course and include the same grade of academic work.

The academic work corresponds fairly closely with that for preparatory engineering for those students planning a commercial career, and with the normal course for industrial teachers for those who wish to become drawing teachers. The drafting room is conducted as nearly as possible like the regular commercial drafting room. The completion of the course fully equips the graduate to enter either the teaching or the commercial field at a remunerative compensation.

FIRST YEAR.

Free-hand perspective, decorative design, rendering in colors, pen and ink sketching, geometrical drawing, lettering, descriptive geometry, scale drawings made in orthographic and cabinet projection, and isometric drawing.

SECOND YEAR.

Furniture designing, pattern and sheet metal drafting, simple house design and construction, a study of the orders of architecture, and linear perspective.

THIRD YEAR.

Machine drawing and design, strength of materials, graphic statics, building construction and design, linear perspective, estimates, specifications, and contracts.

FOURTH YEAR.

The fourth year's work will be elective; machine designing for mechanics, architectural designing for advanced study in construction, or topographical drawing for surveyors. Estimates, specifications, and contracts.

Commercial work.—In addition to the designing, drafting, and blue-printing for the various departments of the school itself, the commercial work of this department amounted to approximately ₱3,500 for the year 1910–11. This covered a great variety of work done for private parties and branches of the Government. Some idea of the nature may be obtained from the following list of work orders: Furniture designs for various Bureaus, drawings for zinc line-etchings, plans and specifications for cottages, preparation of Patent Office drawings, crayon portraits, preparation of drawings and blue-prints of lace and embroidery patterns, making of monograms, etc.

NORMAL COURSE FOR INDUSTRIAL TEACHERS.

The academic work comprises the essentials of the secondary course, laying stress upon English, mathematics, mechanical sciences, and methods of teaching. The shop work requires the completion of a full four year trade course with additional normal work. A pupil entering this course with advanced credit in any trade may take additional work in another trade. An advanced credit of two years' work in woodworking, for example, would allow a pupil to complete his woodworking course and take two additional years in woodworking, drafting, ceramics, or wheelwrighting. Six manual training centers in Manila are taught by pupils of this school as a regular part of their normal work. Graduates of this course are eligible to appointment as junior industrial teachers without the necessity of taking the civil service examination.

PREPARATORY ENGINEERING.

All high grade engineering institutions require shop work either as an entrance requirement or as part of the curriculum. The preparatory engineering course enables a pupil to complete his shop work before entering the University. The course consists of four years' work in mathematics, English, and mechanical sciences. Shop work takes the place of ancient and modern languages. An intermediate certificate will be required for admission, but no pupil who is not strong in mathematics should attempt this course.

The first year is spent in bench work in wood, the second in chipping and filing, and forge work, the third in pattern making and foundry, and the fourth in machine-shop practice.

TEACHERS' VACATION ASSEMBLY.

The Seventh Vacation Assembly for Filipino teachers will be held at the buildings of the Philippine School of Arts and Trades from April 15, 1912, to May 24, 1912.

Teachers should arrive in Manila one or two days before the opening of the assembly in order to find a good boarding place and make other preliminary arrangements. Except for very good reasons, such as failure of a boat to arrive on time, no teacher will be admitted after Tuesday of the first week. No teacher will be admitted who can not do sixth-grade work at least.

Teachers desiring admission should make application immediately on the "enrollment blank" which can be secured from the Superintendent of the Philippine School of Arts and Trades or from the division superintendent. This blank should be filled out at once and forwarded to the division superintendent, who will approve it and send it to the proper authority. Applicants should state by number the courses they desire to take, as only such courses will be given as are requested by a reasonable number of teachers. On the receipt of the "enrollment blank" from the division superintendent, an "assignment slip," showing classes, teachers, periods, etc., will be made out and ready for each teacher on the opening day of the assembly, thus avoiding any loss of time due to enrollment. The detailed program of classes for the assembly will be made out as soon as the "enrollment blanks" have been received and the arrangement of the courses will be such that each teacher who comes will receive such work as will fit him to do his special work better upon his return to his province.

Each teacher will be expected to take five hours' work daily. No one will be allowed to take more than six hours' work per day.

COURSES.

1. Shop exercises prescribed in the Manual of Elementary Carpentry. Three hours daily. Beginners will be advanced as rapidly as their individual ability permits. Advanced pupils will be given work according to their qualifications. Stress is laid upon accurate work and many teachers who have already completed the work outlined in the Manual will profit by a thorough review of the exercises.
2. Making simple pieces of furniture from blue prints. Three hours daily. Open to pupils who have had at least two years' work in drawing and woodwork.
3. Advanced woodwork. Four hours daily. In this course the teacher will be required to make a working drawing of an assigned piece of furniture, draw up a bill of materials, estimate its cost, execute the work in the shop, finish it in the finishing department, make a mechanical drawing in the drafting department, and verify the bill of materials and estimate. This work will be open only to graduates of manual training or trade courses.
4. Tools. Two hours daily. An intensive course on the classification, uses, and methods of sharpening saws. Teachers taking this course may bring along two bandsaws needing sharpening and three bandsaws needing brazing. The materials used in brazing will be charged to the provinces from which the bandsaws are sent. Upon the completion of this work, the grinding of edge tools will be taken up.

5. Finishing. Two hours daily. The use of wax and shellac. Application of stains.

6. Primary industrial drawing. Two hours daily. Based on the Manual of Elementary Carpentry.

7. Intermediate industrial drawing. Two hours daily. Based on Courses in Mechanical and Free-Hand Drawing, Bulletin No. 32.

8. Mechanical and free-hand lettering. Two hours daily.

9. Elements of building design. Three hours daily in drafting department. Open only to graduates of manual training or trade schools.

10. Advanced mechanical drawing. Two hours daily. For trade school graduates only.

11. Free-hand and decorative design. Two hours daily. This work is for teachers who are required to handle free-hand and decorative drawing in intermediate schools. The work will be based upon the prescribed course in drawing.

12. Shop mathematics. One hour daily. A course in mensuration and estimating for teachers who have had some woodwork but have not completed Grade VII.

13. Estimating as applied to woodwork. One hour daily. For intermediate graduates only.

14. Lectures on teaching woodwork in manual training classes. One hour daily.

15. Lectures on teaching woodwork in trade schools. One hour daily.

16. Reports, property, and correspondence for trade school teachers. One period daily.

17. Lectures on simple furniture construction. One hour daily. Notes and drawings are kept on the proper construction and design of simple furniture. For teachers who have had two years or more in woodworking.

18. Lectures on advanced furniture construction. One hour daily. Notes and drawings are kept on the proper construction and design of furniture of somewhat difficult styles. For manual training or trade school graduates only.

19. Kerosene engines. Two hours daily. A short course in the care and use of kerosene engines. This course is designed for and limited to teachers who will be expected to handle engines in woodworking shops next year. It is

not planned to turn out skilled engineers owing to the limited time devoted to the course. A great deal of the instruction will be individual and progress will depend upon the capacity of the pupil.

20. Visits of inspection. Trips will be made to points of commercial interest in the city. The Insular Ice Plant, the Bureau of Printing, and Engineer's Island will be visited. Representative cigar factories, sawmills, match factories, etc., will be inspected under the guidance of a teacher regularly assigned to such work.

RECORD OF GRADUATES.[1]

[Total number, 87.]

Occupation.	Number.	Average salary.
Boiler maker	1	₱87.00
Cabinet maker	1	45.00
Cinematograph operator	1	38.00
Clerk	4	38.75
Draftsman	3	60.00
Electrician	1	50.00
Engineer	5	56.00
Foreman	1	60.00
Machinist	3	52.08
Mechanic	13	51.92
Shoemaker	1	30.00
Storekeeper	1	40.00
Student	4	----------
Teacher, industrial	35	49.71
Machinery salesman	1	70.00
Unemployed	4	----------
Income unknown:		
Clerk	1	----------
Employed in United States	1	----------
Garage proprietor	1	----------
Insurance solicitor	1	----------
Merchant	1	----------
Sugar-mill proprietor	1	----------
Rattan furniture manufacturer	1	----------
Wood carver	1	----------
Total	87	----------
Average salary	----------	50.80

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[1] The great majority of the pupils do not complete a four years' course as they are able to enter paying positions before graduation.

DISTRIBUTION OF PUPILS BY PROVINCES AND COURSES.

BY PROVINCES.

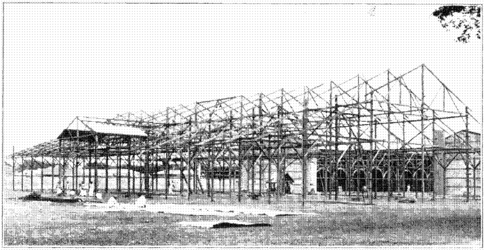
Province.	Regular course 1911-12.	Vacation Assembly.
Manila	88	18
Albay	16	3
Antique	2	1
Bataan	2	
Batangas	26	9
Bohol	4	
Bulacan	58	9
Cagayan	1	
Camarines	1	4
Capiz	9	2
Cavite	22	4
Cebu	10	2
Ilocos Norte	26	5
Ilocos Sur	10	6
Iloilo	11	4
Isabela	2	
Laguna	31	1
Leyte	17	15
Mindoro	1	
Misamis	3	1
Moro Province	1	
Mountain Province	1	3
Nueva Ecija	7	7
Nueva Vizcaya	4	
Occidental Negros	6	1
Oriental Negros	2	
Palawan	1	2
Pampanga	35	8
Pangasinan	17	8
Rizal	55	21
Samar	5	5
Sorsogon	5	5
Surigao	1	1
Tarlac	8	6
Tayabas	14	6
Union	23	9
Zambales	10	2
Total	535	163

BY COURSES.

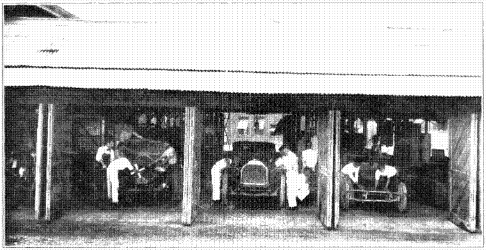
Course.	Regular course 1911-12.	Vacation Assembly.
Stationary engineering	20	
Automobile operation	51	
Blacksmithing	61	
Ceramics	39	
Drafting	11	
Machine-shop practice	103	
Preparatory engineering	10	
Industrial teachers' course	48	
Wheelwrighting	63	
Woodworking	129	163
Total	535	163

SUMMARY.

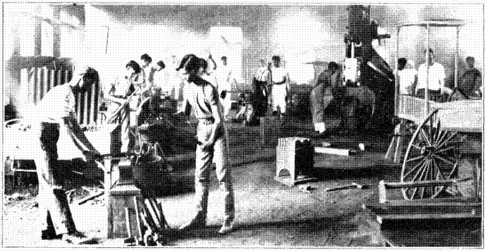
Regular courses	535
Vacation Assembly	163
Total	698
Number counted twice	76
Net total enrollment	622



EXPOSITION BUILDING, BEING CONSTRUCTED WHOLLY BY PUPILS.

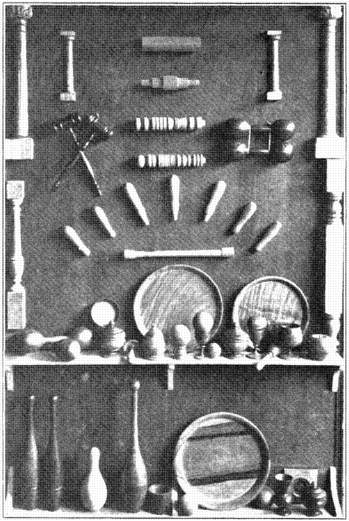


ENTRANCE TO GARAGE.

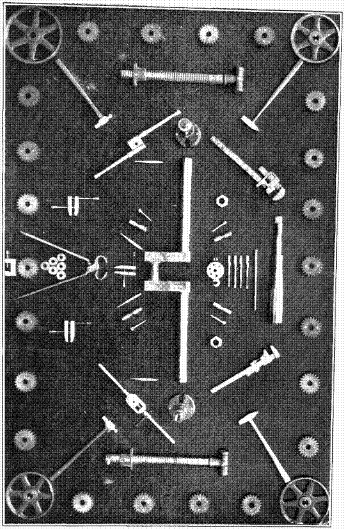


ONE HALF OF THE BLACKSMITH SHOP.

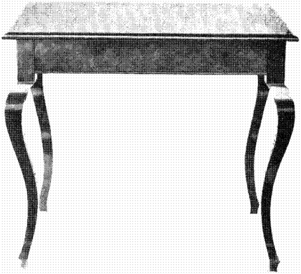
PLATE V.



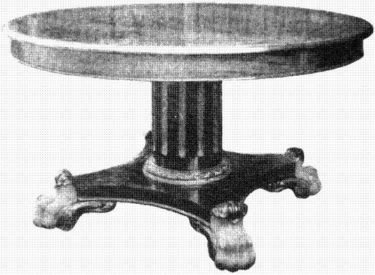
EXERCISES IN WOOD-TURNING.



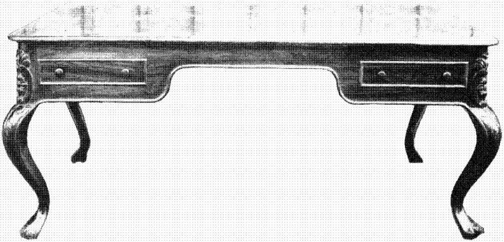
PRODUCTS OF MACHINE SHOP.



TEA TABLE.



DINING ROOM TABLE.



OFFICE TABLE.

BUREAU OF EDUCATION PUBLICATIONS—Continued.

(Concluded from second page of cover.)

CIVICO-EDUCATIONAL LECTURES:

1. The Rights and Duties of Citizens of the Philippines. 1910. (Supply limited.)
2. The Prevention of Diseases 1910. (Supply limited.)
3. Rice. 1910. (Supply limited.)
4. Diseases of Animals. 1910. (Supply limited.)
5. Coconut Beetles. 1910. (Supply limited.)
6. The Housing of Public Schools. 1910. (Supply limited.)
7. Coconuts. 1911.

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